LATTICEWORK PANEL

FIELD OF THE INVENTION

The present invention relates to latticework and in particular to an improved style of construction for lattice.

BACKGROUND ART

Lattice structures are very popular for many purposes where panels are typically useful, and generally combine desirable characteristics of strength, light weight, and low cost. A typical lattice structure is formed from straight elements such as elements arranged in a crossing pattern and fastened together, forming openings in the shape of parallelograms, often referred to as diamond-shaped.

The conventional lattice structure typically has border elements to make the overall structure stronger, and they define a boundary and elements for joining with other lattice structures to provide such as a fence or divider.

By varying structural dimensions and relationships in the assembly of a conventional lattice structure, the relative area of openings may be varied, and the geometry of the parallelogram openings may be varied as well. For example, lattice structures of this conventional sort may have crossed horizontal and vertical elements (slats) fastened at right angles, in which case the openings are rectangles or squares. The structural elements form regular and repeatable openings by the fact that about one-half of the elements are arranged parallel at one angle with a fixed reference, and the other one-half are arranged parallel at a second angle with the same reference.

Conventional lattice structures are generally formed of straight elements, or slats, and although these structures have many uses, the geometry is not pleasing to everyone, and the use of such structures is thus somewhat limited. Lattice structures of curved elements are also available. These may have a different appeal and be more aesthetically pleasing to some consumers.

In construction of lattice panels, the slats of one direction are generally disposed over the slats of the other direction. Therefore they are

generally thick wider than the thickness of a single lattice member. These are generally fixed to one another using a fastener of some kind, usually nails, screws or staples.

The areas where the slats overlap are also sometimes provided with a rebated portion allowing the slats to fit together forming a structure having a single slat thickness. Rebating however generally only works well with wooden constructions, metal being difficult to apply a rebate to.

Both the method of using fasteners and the provision of rebates weaken the lattice panel. They provide points of weakness about which the lattice slats may splinter.

Lattice formed in the usual ways also tends to sag when not supported or when the lattice panel is larger. The weight of the slats and the entire panel bears on the fasteners and the rebates and may affect the strength or integrity of the panel. For this reason, these types of panel are unsuitable for use in security situations.

Lattice may also be manufactured using a preformed panel often made using a plastic sheet with the lattice pattern stamped out of the sheet. Lattice formed in this manner is quite thin, as it must be pressed out by a machine while the plastic is still cooling after the sheet is extruded. This type of plastic lattice is usually weaker, unsuitable for security situations and also tends to sag.

The most common materials used in the construction of lattice panels are wood, plastic and light metals such as aluminium. Wood has many disadvantages, such as being relatively heavy for a given strength, as well as splitting and breaking under impact. Furthermore, wood will tend to rot and decay under most conditions and must be protected either by a preservative finish using an expensive chemical treatment or else painted with appropriate decorative finishes which must be reapplied periodically. Thus the complete cost of a wood fenced is not only the original cost of erecting it, but also the continuing cost of maintenance and repair.

In order to overcome the problems with wood as a lattice material, a number of substitutes have been proposed, particularly plastics, and of these polyvinyl chloride or PVC has been one of the most popular.

PVC has the advantages of easy fabrication by extrusion, molding and other processes, as well as reasonable cost and durability, since it can easily be coated with the necessary protective and finishing materials. PVC is however generally weaker than metals.

Aluminium is also used in construction and is used as security doors and screens. These constructions are often riveted together and the rivets therefore offer points of weakness about which the lattice may bend.

OBJECT OF THE INVENTION

The present invention is directed to a latticework panel, which may at least partially overcome the abovementioned disadvantages or provide the consumer with a useful or commercial choice.

In one form, the invention resides in a latticework panel comprising a plurality of lattice members arranged in a network, the plurality of lattice members comprising at least one first lattice member disposed in a first direction and at least one second lattice member disposed in a second direction, and at least one passage located in the at least one first lattice member through which the at least one second lattice member passes, the passage having a periphery which extends substantially about the at least one second lattice member.

Lattice may be formed in this manner without rivets or other fasteners. The lattice is also less likely to sag under its own weight. The removal of the overlapping slats results in a slimmer lattice panel which may be used in security situations as doors or window panels or in a larger form as a wall panel.

There will suitably be more than one member disposed in each direction. The plurality of lattice members will preferably take the form of approximately half the number of members disposed on one direction and the other approximately half disposed in a second direction to form the network. The network will therefore preferably have a cross-like appearance.

Each lattice member may preferably be a strip member. The members may of course also be of any other cross-section required by a user or manufacturer of the lattice panels. For example, a round member may be preferred by a consumer for aesthetic reasons or to reduce the appearance of

the lattice as a two-dimensional panel. Preferably, the members may not be rectangular or other shape possessing sharp corners or apices as these could weaken the overall structure of the lattice panel. Members of these shapes may however be used in some situations.

The material used for construction of the lattice members may preferably be a light but strong metal such as aluminium. Alternatively, a plastics material such as PVC may be used. This will suitably provide the lattice with the strength required to be used in security situations but remain light and slimmer in appearance than heavier or denser materials.

The shape of the network of lattice members may be of any shape required by a consumer. Such shapes may be square in appearance, but it may also be diamond shaped (or angled to the horizontal), or rounded in appearance. The shape of the panel and the network may also be abstract or freeform.

The arrangement of the network itself may preferably be an orderly array of lattice members with the intersection of each first lattice member with a second lattice member providing a lattice point. The lattice points may suitably be arranged in any two or three-dimensional pattern. Such pattern may be regular or abstract. The pattern may be based on any shape including circular, polygonal or conic sections.

By varying structural dimensions and relationships in the assembly of a lattice network, the relative area of any openings may be varied. The spacing of the members in the present invention may preferably be such that the openings are large enough to allow an unobstructed view or passage of air but small enough to provide security when necessary.

The openings in the lattice may suitably be of any shape also, and will preferably be related to the array of the lattice.

The size of the panel may be varied to suit the application to which the panel is to be put. For example, when used as a door, the panel will preferably be between 1.5 and 3 meters in height and 0.5 to 3 meters in width. When used in other situations, the panel will be suitably sized in order to achieve its purpose.

Each first lattice member may preferably be substantially oval in

cross-sectional shape. It may also preferably have a cross-sectional shape having two substantially linear, parallel sidewalls and two arcuate end walls.

Each first lattice member may preferably be extruded. The extrusion may be of any length required.

Each first lattice member may have any dimensions, but preferably may be between approximately 1 cm and 10 cm in a first direction, and 1 mm to 10 cm in a second direction.

Each first lattice member preferably may be tubular in construction. The tubular construction will preferably provide strength and rigidity to the lattice but not add excessive weight to the construction. However a solid lattice member construction may preferably be used in specific situations.

Each first lattice member will preferably have at least one passage disposed through it and more preferably will have a plurality of passages. The passages may suitably be spaced along each first lattice member. The passages may preferably approximate the size and/or shape of the exterior of the second lattice members. The passages will preferably be sized to provide an interference fit with the second lattice members. The interference fit may be a tight interference fit or a loose interference fit.

The passages are suitably shaped to receive the second lattice members in a way that the second lattice members may be pushed through the passages without the use or a hammer or like device. The passage may suitably be sized to firmly grip the second lattice member but not to deform the second lattice member when it passes through said passage.

The wall thickness of each first lattice member will preferably be similar and be between approximately 0.5 mm and 10 mm. Thicker walls may be provided for members in larger panels, as those members will have to support a greater weight.

Each second lattice member may preferably be substantially oval in cross-sectional shape. It may also preferably have a cross-sectional shape having two substantially linear, parallel sidewalls and two arcuate end walls.

Each second lattice member may preferably be extruded. The

extrusion may be of any length required.

Each second lattice member may have any suitable dimensions, but preferably may be between approximately 1 cm and 10 cm in a first direction, and 1 mm to 10 cm in a second direction.

Each second lattice member may be solid, but preferably will be tubular in construction. The tubular construction will preferably provide strength and rigidity to the lattice but not add excessive weight to the construction. Solid construction may preferably be used in specific situations.

Each second member may comprise at least one reinforcing member. The reinforcing member may preferably be disposed substantially centrally inside the tubular second member. The reinforcing member will suitably be elongate and extend substantially the length of the second member. The reinforcing member may comprise more than layer. For example, the reinforcing member may comprise an outer member of plastic and an inner member of metal. The reinforcing member may be of any shape. The reinforcing means may be attached to at least one interior wall of the second member.

Each second lattice member may also preferably have at least one passage disposed through it but more preferably will not have passages. As the second member may have a reinforcing member inside it, the second member may suitably not have openings therein. Any passages may suitably be spaced along each second lattice member. The wall thickness of each second lattice member will preferably be similar and be between approximately 0.5 mm and 10 mm. Thicker walls may be provided for members in larger panels, as those members will have to support a greater weight.

The external dimensions of each second lattice member will preferably be slightly smaller than the external dimensions of each first lattice member. This is due to the fact that each first member preferably has passages disposed within it to accept a second lattice member.

Each second lattice member may preferably be disposed substantially perpendicular to the first lattice members to form a two-dimensional panel.

In another form, the invention resides in a latticework panel comprising a plurality of lattice members arranged in a network, the plurality of lattice members comprising at least one first lattice member disposed in a first direction and at least one second lattice member disposed in a second direction, at least one passage located in the at least one first lattice member through which the at least one second lattice member passes, the passage having a periphery which extends substantially about the at least one second lattice member and at least one frame member to which at least some of the lattice members are attached.

The at least one frame member will preferably be located at the periphery of the lattice panel. There will preferably be more than one frame member forming a surround for the panel. These frame members forming a surround for the panel are preferably border elements to make the overall structure stronger, and they define a boundary and elements for joining with other lattice structures to provide such as a fence or divider.

The frame members may preferably possess openings corresponding to the size of either the first or second lattice members dependent upon the position of the frame member.

Each frame member may preferably comprise a spine portion and at least one flange member extending from the spine portion to abut against either at least one first or second lattice member. The spine portion is preferably constructed of a box section and the flange members are suitably box sections as well. There may preferably be two flange members extending from each spine member defining a first recess and either the at least one first or at least one second lattice member may preferably be received with an interference fit between the two flange members.

Each frame member may also preferably comprise a second recess located between the spine portion and the flange members disposed substantially perpendicular to the first recess to accommodate the positioning of a fly screen member adjacent the lattice panel. The second recess may have at least one serrated portion on the inner surface of the recess to enhance the positioning of the fly screen member.

BRIEF DESCRIPTION OF THE DRAWINGS

Various embodiments of the invention will be described with reference to the following drawings, in which:

Figure 1 shows an exploded perspective view of a lattice panel according to an aspect of the invention showing also the frame members.

Figure 2 shows a sectional view of the lattice panel and the frame member.

Figure 3 shows a sectional view of a frame member.

BEST MODE

In one broad form, the present invention provides a latticework panel 10 comprising a plurality of lattice members 11 arranged in a network, the plurality of lattice members 11 comprising at least one first lattice member 12 disposed in a first direction and at least one second lattice member 13 disposed in a second direction, and at least one passage 14 located in the at least one first lattice member 12 through which a second lattice member 13 is passed.

There is a plurality of lattice members 11 disposed in each direction. The plurality of lattice members 11 are divided so that approximately half the number of members disposed in one direction and the other approximately half disposed in a second direction to form the network. The network has a cross-like appearance. This network may be rotated through any angle to provide a different appearance.

Each lattice member 11 is a strip member. The lattice members 11 are manufactured from aluminium. This provides the lattice with the strength required to be used in security situations but remain light and slimmer in appearance than heavier or denser materials.

The shape of the network of lattice members may be of any shape required by a consumer and a square lattice panel 10 is shown.

The arrangement of the network illustrated is an orderly array of lattice members 11 with the intersection of each first lattice member 12 with a second lattice member 13 providing a lattice point 15. The lattice points 15 are arranged in a two -dimensional pattern as a rectangular lattice.

The spacing of the lattice members 11 shown are such that the openings 16 are large enough to allow an unobstructed view or passage of air

but small enough to provide security.

The openings 16 in the lattice may suitably be of any shape also, and are related to the array of the lattice. In this case, the openings 16 are rectangular.

Each first lattice member 12 is substantially oval in cross-sectional shape. Its cross-sectional shape may also be described as a having two substantially linear, parallel sidewalls and two arcuate end walls.

Each first lattice member 12 is extruded. The length of the extrudate is related to the dimensions of the panel to be formed.

Each first lattice member 12 is between approximately 1 cm and 10 cm in a first direction, and 1 mm to 10 cm in a second direction.

Each first lattice member 12 is tubular in construction. The tubular construction will preferably provide strength and rigidity to the lattice but not add excessive weight to the construction.

Each first lattice member 12 has a plurality of passages 14 disposed through it. Each passage has a periphery that extends around each second lattice member. The passages 14 are spaced along each first lattice member 12. The passages 14 provide an interference fit with the exterior surface of the second lattice members 13.

The wall thickness of each first lattice member 12 is similar and is between approximately 0.5 mm and 10 mm.

Each second lattice member 13 is manufactured of similar materials and in a similar way to each first lattice member 12. Each second lattice member 13 is however slightly different to the first lattice members 12.

The external dimensions of each second lattice member 13 are slightly smaller than the external dimensions of each first lattice member 12. This is due to the fact that each first lattice member 12 must have the passage 14 disposed within it to accept a second lattice member 13.

According to a second aspect of the present invention, the invention resides in a latticework panel 10 comprising a plurality of lattice members 11 arranged in a network, the plurality of lattice members 11 comprising at least one first lattice member 12 disposed in a first direction and at least one second lattice member 13 disposed in a second direction, at

least one passage 14 located in the at least one first lattice member 12 through which a second lattice member 13 is passed, and at least one frame member 17 to which the plurality of lattice members 11 are attached.

There is more than one frame member 17 forming a surround for the panel. The frame members 17 are located around the periphery of the lattice panel 10. These frame members 17 forming a surround for the panel 10 are border elements to make the overall structure stronger, and they define a boundary and elements for joining with other lattice structures to provide a fence or divider.

The frame members 17 also possess receiver openings 18 corresponding to the size of either the first 12 or second lattice members 13 dependent upon the position of the frame member 17.

Each frame member 17 comprises a spine portion 19 and a pair of flange members 20 extending from the spine portion 19 to define a first recess 21 and either the at least one first or at least one second lattice member are received with an interference fit between the two flange members 20.

The spine portion 19 is a box section and the flange members 20 are box sections as well.

Each frame member 17 also comprises a second recess 22 located between the spine 19 and flange members 20, disposed substantially perpendicular to the first recess 21 to accommodate the positioning of a fly screen member (not shown) adjacent the lattice panel 10. The second recess 22 has a serrated portion 23 on the inner surface 24 of the recess to enhance the positioning of the fly screen member.

In the present specification and claims, the word "comprising" and its derivatives including "comprises" and "comprise" include each of the stated integers but does not exclude the inclusion of one or more further integers.